

## CLAIMS

1. A digital signal processing method for converting a digital audio signal, comprising:

the frequency analysis step of calculating power spectrum data from said digital audio signal;

the spectrum data extracting step of extracting a part of power spectrum data from said power spectrum data;

the classification step of classifying said digital audio signal based on said part of power spectrum data; and

the predictive operation step of generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

2. The digital signal processing method according to claim 1, wherein:

in said frequency analysis step, various operation processing methods of window function are provided; and

desired operation processing method is used according to the frequency characteristic of said digital audio signal.

3. The digital signal processing method according to claim 1, wherein;

in said spectrum data extracting step, power spectrum

data having DC component is excepted when said part of power spectrum data is extracted.

4. The digital signal processing method according to claim 1, wherein;

in said predictive operation step, a predictive coefficient that has previously generated by learning based on a desired digital audio signal is used.

5. The digital signal processing method according to claim 1, wherein:

said power spectrum data is formed by almost symmetric components; and

in said spectrum data extracting step, either right or left of the components is an object to be extracted, in said power spectrum data.

6. A digital signal processing apparatus for converting a digital audio signal, comprising:

frequency analysis means for calculating power spectrum data from said digital audio signal;

spectrum data extracting means for extracting a part of power spectrum data from said power spectrum data;

classification means for classifying said digital audio signal based on said part of power spectrum data; and

predictive operation means for generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

7. The digital signal processing apparatus according to claim 6, wherein:

said frequency analysis means provides various operation processing means of window function; and

desired operation processing means is used according to the frequency characteristic of said digital audio signal.

8. The digital signal processing apparatus according to claim 6, wherein;

said spectrum data extracting means excepts power spectrum data having DC component when said part of power spectrum data is extracted.

9. The digital signal processing apparatus according to claim 6, wherein;

said predictive operation means uses a predictive coefficient that has previously generated by learning based on desired digital audio signal.

10. The digital signal processing apparatus according to

claim 6, wherein:

said power spectrum data is formed by almost symmetric components; and

said spectrum data extracting means extracts either right or left of the components in said power spectrum data.

11. A program storage medium for making a digital signal processing apparatus execute a program, comprising:

the frequency analysis step of calculating power spectrum data from a digital audio signal;

the spectrum data extracting step of extracting a part of power spectrum data from said power spectrum data;

the classification step of classifying said digital audio signal based on said part of power spectrum data; and

the prediction step of generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

12. The program storage medium according to claim 11, wherein:

in said frequency analysis step, various operation processing methods of window function are provided; and

desired operation processing method is used according to the frequency characteristic of said digital audio signal.

13. The program storage medium according to claim 11,  
wherein;

in said spectrum data extracting step, power spectrum  
data having DC component is excepted when said part of power  
spectrum data is extracted.

14. The program storage medium according to claim 11,  
wherein:

said power spectrum data is formed by almost symmetric  
components; and

in said spectrum data extracting step, either right or  
left of the components is an object to be extracted, in said  
power spectrum data.

15. A learning method for generating a predictive  
coefficient to be used in a digital signal processing device  
for converting a digital audio signal, in prediction of said  
conversion processing, comprising:

the learner digital audio signal generating step of  
generating a learner digital audio signal that desired  
digital audio signal has deteriorated;

the frequency analysis step of calculating power  
spectrum data from said learner digital audio signal;

the spectrum data extracting step of extracting a part  
of power spectrum data from said power spectrum data;

the classification step of classifying said digital audio signal based on said part of power spectrum data; and

the predictive coefficient calculating step of calculating a predictive coefficient corresponding to said class based on said digital audio signal and said learner digital audio signal.

16. The learning method according to claim 15, wherein:

in said frequency analysis step, various operation processing methods of window function are provided; and  
desired operation processing method is used according to the frequency characteristic of said digital audio signal.

17. The learning method according to claim 15, wherein;

in said spectrum data extracting step, power spectrum data having DC component is excepted when said part of power spectrum data is extracted.

18. The learning method according to claim 15, wherein:

said power spectrum data is formed by almost symmetric components; and

in said spectrum data extracting step, either right or left of the components is an object to be extracted, in said power spectrum data.

19. A learning device for generating a predictive coefficient to be used in a digital signal processing apparatus for converting a digital audio signal, in predictive operation of said conversion processing, comprising:

learner digital audio signal generating means for generating a learner digital audio signal that desired digital audio signal has deteriorated;

frequency analysis means for calculating power spectrum data from said learner digital audio signal;

spectrum data extracting means for extracting a part of power spectrum data from said power spectrum data;

classification means for classifying said digital audio signal based on said part of power spectrum data; and

predictive coefficient calculating means for calculating a predictive coefficient corresponding to said class based on said digital audio signal and said learner digital audio signal.

20. The learning device according to claim 19, wherein:

said frequency analysis means provides various operation processing means of window function; and

desired operation processing means is used according to the frequency characteristic of said digital audio signal.

21. The learning device according to claim 19, wherein;  
said spectrum data extracting means excepts power  
spectrum data having DC component when said part of power  
spectrum data is extracted.

22. The learning device according to claim 19, wherein:  
said power spectrum data is formed by almost symmetric  
components; and

said spectrum data extracting means extracts either  
right or left of the components in said power spectrum data.

23. A program storage medium for making a digital signal  
processing apparatus execute a program comprising:

the learner digital audio signal generating step of  
generating a learner digital audio signal that desired  
digital audio signal has deteriorated;

the frequency analysis step of calculating power  
spectrum data from said learner digital audio signal;

the spectrum data extracting step of extracting a part  
of power spectrum data from said power spectrum data;

the classification step of classifying said digital  
audio signal based on said part of power spectrum data; and

the predictive coefficient calculating step of  
calculating a predictive coefficient corresponding to said  
class based on said digital audio signal and said learner



digital audio signal.

24. The program storage medium according to claim 23,  
wherein:

in said frequency analysis step, various operation  
processing methods of window function are provided; and

desired operation processing method is used according  
to the frequency characteristic of said digital audio signal.

25. The program storage medium according to claim 23,  
wherein;

in said spectrum data extracting step, power spectrum  
data having DC component is excepted when said part of power  
spectrum data is extracted.

26. The program storage medium according to claim 23,  
wherein:

said power spectrum data is formed by almost symmetric  
components; and

in said spectrum data extracting step, either right or  
left of the components is an object to be extracted, in said  
power spectrum data.